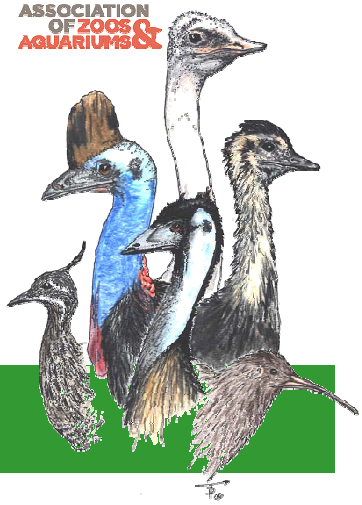
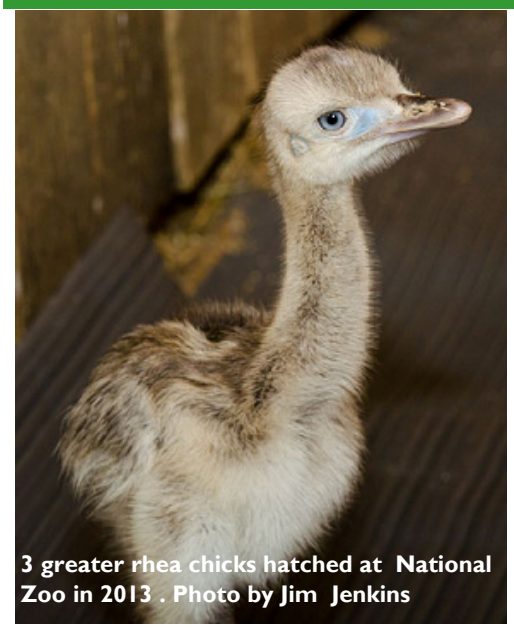
AZA Ratite TAG

The Ratite Review



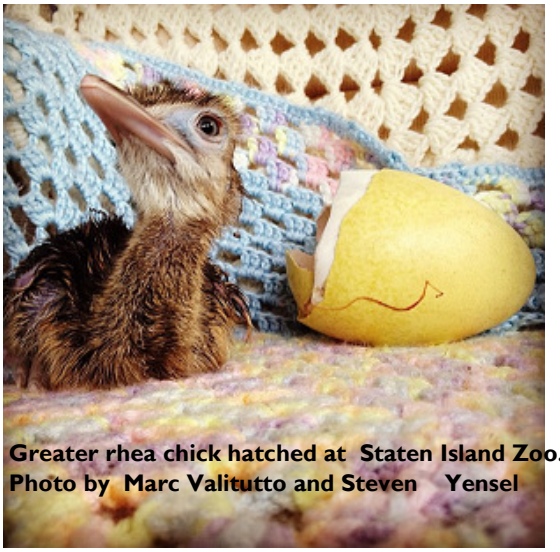
THE AZA'S RATITE TAG'S ANNUAL NEWSLETTER

2013 Ratite Hatchings

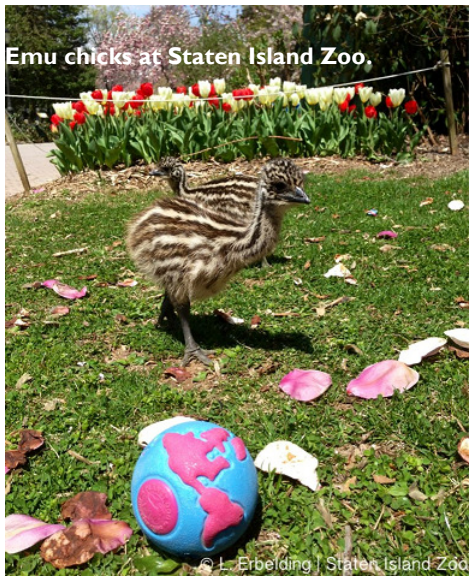


3 greater rhea chicks hatched at National Zoo in 2013 . Photo by Jim Jenkins

Cassowary chick with sire, VA Zoo. Photo by Alexandra Zelazo-Kessler



Greater rhea chick hatched at Staten Island Zoo. Photo by Marc Valitutto and Steven Yensel



Emu chicks at Staten Island Zoo.

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Going Viral for Ratites at the Staten Island Zoo

by Marc Valitutto, VMD | General Curator, Veterinarian

An epidemic of viral proportions has hit the Staten Island Zoo (SIZ) in 2013 with a 'dis'-Order of 'Struthioniformes' as the primary diagnosis. It is a condition the SIZ has embraced and looks forward to a permanent life with.

Although the SIZ has always been known for an excellent rattlesnake collection, it has also enjoyed longtime displays of emus, rhea and a single cassowary. Over the last 50 years, however, most everything had passed on or moved out with continued structural renovations. The last pair of greater rheas were exhibited in the 1970's and a lone Southern cassowary passed on in 1963. Emus had come and gone through the years, with a final pair exhibited for the last ten.

In 2012, plans were laid out to redevelop the entrance of the Zoo to create a new taxonomic based exhibit called "Ratite Row." As typical for many other zoological institutions, the ratites are to be exhibited alongside each other for comparison. Multi-species exhibits will be accommodated where geographically and communally appropriate. On the opposite side of the path, life-size statue replicas of ratites of the past are planned for display in imaginable settings and poses (e.g. elephant bird and moa). The ultimate goal is to offer the visitor an immediate wild and prehistoric welcome with the largest birds of the world.

Following several renovations for "Ratite Row," acquisition of ratites commenced in 2013. This began with the controlled hatching of only two emu eggs from a pair of 20 year old birds in the collection. The two male chicks, "Lynn" and "Bill," hatched April 9th and 10th, were parent incubated but hand-reared in the nursery on display. Ample care was taken to ensure the birds received adequate exercise with multiple walks throughout the Zoo, daily. As expected, the emu hatchlings have been a great source of learning and pleasure for our visitors. The pair are harness trained and remain calm in most situations, and thus are used well for education programs.

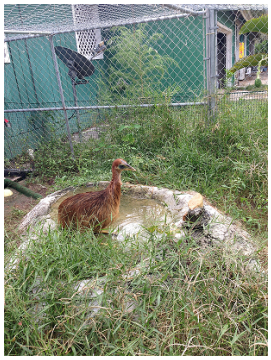
In May, two staff members took a day trip down to the National Zoo to receive a trio of nearly full-term greater rhea eggs. The eggs were incubated on display in our nursery using an Rcom Pro 20 Bird Incubator with successful, unassisted, hatches six and seven days after their arrival on May 14th. The birds pipped alongside several pheasants within the same incubator. Two out of the three females survived the first week. The birds were less amenable to hand-rearing, but nevertheless, thoroughly enjoyed long walks around the Zoo. Currently, the rheas are housed in the Children's Center with several llama, and allow infrequent petting. Eventually, they will be housed in a new "Brazilian Pantanal" exhibit.

Continuing on with the acquisition of ratites, the SIZ made room for a pair of adult ostriches in September, which were purchased from Todd Applebaum of Roaming Acres Farm in New Jersey. The sprawling farm of Struthios is primarily to supply the demand for ostrich eggs and meat for the New York City metropolitan region, but a minor part of the business is to supply live birds to other local AZA facilities. Mr. Applebaum invited several SIZ staff members out to the farm to offer lessons on ostrich handling and to tour the well-equipped and modern facility.

On arrival, the birds were hooded with ease and walked to their temporary enclosure. The pair settled in fast and became an immediate attraction partly for being displayed for the first time ever on Staten Island. The ostriches received their medical workups, including blood sampling and vaccination uneventfully, with minimal restraint. To account for an expected change in personality, the male has been successfully trained to transfer via positive reinforcement to allow for standard exhibit maintenance.

Finally, to complete the acquisition of the major ratite species, the SIZ initiated a very successful crowd-sourcing fundraiser. Through the use of the online fundraising website, Indiegogo, the SIZ raised over $9,000 towards the acquisition of a single double-wattled cassowary. Many members of the public were vital in helping us achieve the fundraising goal with the creation of cassowary artwork as well as a larger than life-size cassowary mascot costume.

Following the two month campaign, funds were directed to the Cassowary Conservation Fund towards the purchase of a female which hatched in April 2013. The bird is expected to arrive in the spring of 2014, adding an additional female specimen to the AZA managed program.



The Staten Island Zoo recognizes the educational and inspirational value of these ratite species and therefore is delighted to display them to the community. Additionally, the cassowary will be the only specimen in the Northeastern, US, which will hopefully provide a visual source for the public to appreciate and admire. *All photos credit to Marc valitutto and Steven Yensel*

Keeper Tracks

Meet Eric! Ratite Keeper at the National Zoo!

When I was a child I loved dinosaurs. I once told my parents that when I was older I was going to build a time machine and go back to the age of dinosaurs and bring home a baby tyrannosaurus rex. I liked dinosaurs so much I would often dig huge holes in our yard looking for bones.

My dad took me to the San Francisco Zoo when I was 12. That is when by I saw my first real live dinosaur. Or so I thought. It was a double-wattled cassowary and I couldn't take my eyes off of it.

Twenty years later, I began working for the Smithsonian National Zoo as a keeper for the greater rhea, emu and double-wattled cassowary. Working here gives me a great opportunity to educate the public about one of the most reclusive and misunderstood birds. Few know how important the cassowary is to the Northern Australian rainforest ecosystem.

Our cassowary at the National Zoo, like most, was a misanthrope. Through dedicated training, habitat additions and enrichment she has become a draw for visitors attending our summer demo's.

It is a privilege and a joy to be a steward for these large and dynamic animals and I look forward to many years of working with them.

Eric Slovak is a graduate of Virginia Commonwealth University, B.S. biology. He is married to his wife Jenny and has a 2 year old son Liam.

Enhancing our Understanding of Ratite Nutrition for Improved Conservation Management

by Lindsay Grey

Ratites are unique and fascinating. Arguably the most unusual of all birds, ratites don't fly, are huge, lay huge eggs, and have beautiful shaggy feathers. They practice highly unusual parental care and raise playful, super precocious chicks. Their comedic behaviour, which includes hilarious grunt-tastic mating, elaborator courtship 'dancing' and sometimes intense territoriality, have made ratites the toast of YouTube (search, 'emu tango'!). Undoubtedly this charisma led to two groups, the kiwi and emu, becoming respective national icons of New Zealand and Australia.

Despite this fame, wild ratites in Australasia are under threat. Populations of all five kiwi species and the three cassowary species are at risk variously due to introduced predators, habitat fragmentation and direct anthropogenic impacts like car strike. Even emu, who are a widespread species in Australia, have their natural food-seeking mass migrations impeded by agricultural fencing – sometimes with disastrous consequence (http://www.dec.wa.gov.au/pdf/plants_animals/living_with_wildlife/0805_emu.pdf).

New Zealand's kiwi species are now wholly reliant on conservation management for population growth. Management practice involves collecting eggs from the wild, raising juvenile birds in captivity on artificial diets, and releasing them back as more "predator proof" sub-adults.

The Southern Cassowary of Queensland, Australia is also endangered in the wild. The fragmented nature of cassowary habitats necessitates supplementary feeding of wild populations occurs routinely. And while it may seem trivial, a substantial number of birds have become habituated to non-sanctioned feeding by people at campgrounds. Why do cassowary habituate so keenly? What are the health consequences of a 'camper's diet'?


http:// ontarions.travellerspoint.com/93

Large discrepancies also exist between wild and captive bird's adiposity and egg size. Captive birds are prone to obesity, which is thought to impede their fertility. In kiwi, captive eggs can be up to 25% smaller than wild eggs. Most likely unbalanced nutrition accounts for these patterns.

As more ratites come under captive, or semi-captive conservation management, great care must be taken to provide birds with optimal nutritional support tailored to their life-stage. Targeted nutrition is an obvious must for sick and injured birds in rehabilitation centres too.

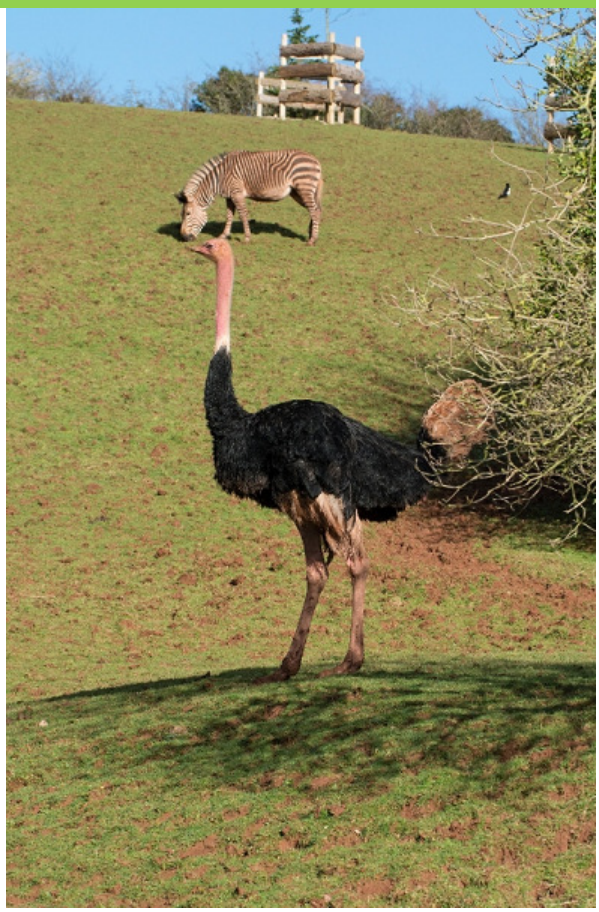
Working with nutritional scientists from the University of Sydney, and in collaboration with experts at Taronga Zoo (Sydney) the Smithsonian National Zoo (Washington DC), and the National Kiwi Trust (New Zealand), we hope to use captive and wild birds (and existing captive records) to improve our knowledge of ratite nutritional needs. Taking a comparative approach we will use 'nutritional geometry' (see http://behmerlab.tamu.edu/thegf.html) to identify optimal diets for kiwi and southern cassowary chicks, juveniles and adults. We would love to extend our work to other species wherever possible. If you would like to be involved in the project, have info to contribute, or have any questions about our approach, please get in touch! The project is still developing, and it would be fantastic to have your input: lindsey.gray@sydney.edu.au, + 61 424 403 614.

Lindsey is a biologist and spent 2 years living in New Zealand working as a kiwi keeper for the National Kiwi Trust, where she developed a ratite passion. The trust raise and release brown kiwi as part of Operation Nest Egg (ONE). ONE sees eggs removed from the wild and raised in captivity. When resultant chicks reach 1 Kg, they are released back to the wild – at this weight they better defend themselves. Without ONE, 95% of kiwi chicks are killed as juveniles by introduced mammalian predators. Lindsey is currently completing her PhD in nutrition and evolution at the University of Sydney, Australia.

Out and About with Ostrich

Managing Two Male Red-necked Ostrich at Paignton Zoo Environmental Park

by Peter Smallbones, Senior Head Keeper of Birds



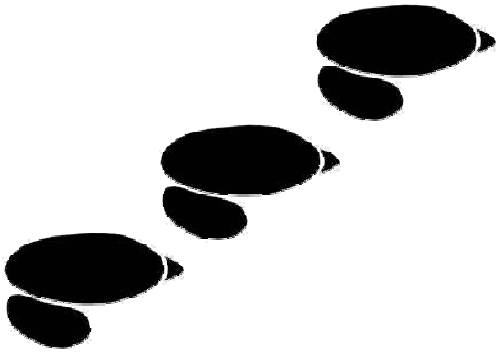
Paignton Zoo Environmental Park holds 2.0 *Struthio camelus camelus* as part of the EAZA EEP. The two young males arrived in September 2011. After being collected as eggs from Sous Massa National Park in Morocco by Hannover Zoo, the eggs hatched and were reared at Hannover Zoo in March 2011.

The two males share a paddock with one farmed female ostrich which has taken on the appearance of a male and 1.2 *Equus zebra hartmannae.* Initially the socialising process progressed slowly. First the young males were introduced to the paddock. Over the course of the next eight weeks they were then introduced to the female ostrich, followed by the zebra stallion and finally the two mares. The introduction process went smoothly.

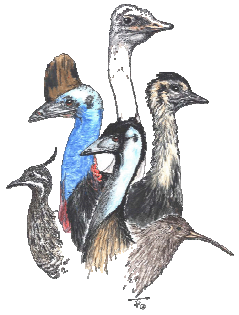
Since the introduction both mares have successfully given birth to stallions and the adult stallion has been exchanged. None of these occurrences have caused a problem.

The female ostrich is the subordinate bird and as such gets fed and housed at night separately. There is a slight dominance between the two Red-necks so they are no longer confined together on any occasion. Since 12 months of age the Red-necks have been managed by a system of gates, stalls and yards, so the keepers do not need to go in with them. The zebras are cared for by mammal keepers and have their own yard and stall system where they are shut in every night. The zebra and ostriches are not given access to the shed and stall systems at the same time so there is never a risk of the ostriches being cornered by the zebras.

Although the Red-necked Ostrich are not fully mature they have gained most of the redness in their necks this past year, which seems to become more prominent in the UK winter and fade in the summer. It will be interesting to see how the group dynamic changes as the males become fully mature. So far this has been successful due to the large paddock size of 10200 metres squared and because of the diligence of the keepers.



SAHARA CONSERVATION FUND



Ostrich Recovery Project in Niger

Why should we care?

The North African ostrich (*Struthio camelus camelus*) was once found throughout the Sahara. This sub-species, also known as the red-necked ostrich, is today critically endangered, having suffered a 98% reduction in its range throughout North and West Africa. On top of decades of over-hunting, a series of droughts in the 1970's and 1980's had a serious additional impact on already feeble ostrich populations throughout the region. In Niger, records and anecdotal accounts show the ostrich to be completely absent from the northern Sahel, its native territory. What remained was an isolated population limited to the Saharan mountain range of Aïr. This population of around 1600 birds survived until the mid-1990's when they were hunted out during civil unrest. The last individual in the wild in Niger is said to have died in 2010. At a regional scale, without urgent conservation action, including reintroduction and rehabilitation of suitable ostrich habitat, the North African ostrich may soon follow its cousin the Arabian ostrich into extinction.

The pair Maria & Aoulaye protecting their nest

Our vision

Through its projects, SCF builds partnerships and capacity for the conservation of wildlife, the restoration of species and habitats, and the promotion of desert fauna and flora in the ecology, economy and culture of Saharan nations. SCF's North African Ostrich Recovery Project aims to provide the framework, resources and technical support to restore a highly-adapted desert race of ostrich in Niger.

Children from Kellé sensitized by SCF local staff

Our goals

In 2007, the AZA Ratite Taxon Advisory Group, the Sahara Conservation Fund (SCF) and a local Nigerien NGO called CERNK partnered on a groundbreaking effort to save the endangered North African ostrich and aid its recovery in the West African state of Niger. The long-term goal of the Ostrich Recovery Project is to reintroduce and establish self-sustaining populations of ostrich back into the wild. This is a multi-faceted program including: captive-breeding and reintroduction; development of a model participatory, multi-partner conservation initiative; establishment of a national ostrich breeding facility that will serve as a platform for building local skills and capacity for husbandry and conservation; improved environmental and conservation education and awareness; and catalytic support for other endangered species and environmental issues.

The Ostrich male Julien incubating eggs

The site & the team

The breeding centre (22 hectares) is located at Kellé, in eastern Niger. The local staff is composed by 1 site manager (Maimounatou Ibrahim Mamadou) in charge of supervising 2 keepers (Ousseïni Idi and Lawali Tahirou) and supervised locally by SCF technical adviser Abdoulaye Harouna. Maimounatou finished last year her Master degree in Biodiversity at the University of Niamey. She grew up in the region of Kellé with a strong interest in Nature conservancy. Her master degree research topic was focused on ostrich conservation in Niger and she spent several months of field work in the ranch of Kellé in the last two years.

Achievements in 2013

- In 2011, SCF launched an Adopt-an-Ostrich campaign in support of its ostrich conservation program. This has been very successful within AZA zoos and has raised some $30,000 over the last two years thanks to the support of the AZA Ratite TAG.

- Efforts to acquire additional breeding stock of the correct genetic type are underway with colleagues in Morocco, Nigeria and Chad. At the end of 2013, four young chicks were purchased from a ranch in Northern Nigeria thanks to the efforts of our partner CERNK, who took the lead for this activity due to chronic security problems in this part of the world. Unfortunately, three of the four birds have already died from as yet unknown causes.

- The breeding center's perimeter fence has been completed and reinforced with a natural biological barrier made of *Leptadenia pyrotechnica* branches preventing incursions of livestock, something which used to be an important factor of disturbance especially during the ostrich breeding season. In the meantime, CERNK agreed with herders and local authorities to allow the access of lands which belong to CERNK's president during periods of droughts. These lands will be used as a backup and will provide good grazing for local livestock. This is part of the win-win situation implemented by SCF and its partners in order to guarantee the success of its conservation projects. In addition, fire breaks were built in March during the strong wind season as every year within the ranch to avoid fire propagation risks.

- During former years, reproduction was almost nil at Kellé with nothing in 2009 and 2010 and 3 eggs only in 2011. This was the result of poor infrastructure and local on-site management, including inadequate nutrition of the adult birds. In 2012, the 3 breeding couples laid 45 eggs in total and 52 eggs in 2013. Egg production is increasing constantly thanks to the quality of food and management but there are still problems of fertility in the birds which needs to be solved.

- In terms of the awareness campaign, students and their teachers from the region came to visit the site during the beginning of the cold season, i.e. outside of the reproductive season. They participate in the cleaning activities of the site to remove plastic bags and all kind of detritus brought by the wind. Awareness is done all year long by the site managers to sensitize and get the support of local leaders and regional authorities.

Ostrich keepers (Lawali & Ousseïni) in Kellé

New site manager (Maimounatou) showing the natural biological barrier

Ostriches in Souss Massa National Park, Morocco

- Beyond running the Kellé breeding site, SCF has been instrumental in raising awareness and support for the development of a national strategy for the ostrich's conservation. This has included both administration and private stakeholders, that should lead to better cooperation amongst all ostrich holders and the free exchange of birds between collections. To consolidate this arrangement a memorandum of understanding has been drafted for signature during 2014.

Main challenges

- 2013 has been a very difficult year in terms of security restrictions on travel to and within Niger (threats from Al Qaida, Boko Haram, etc.), preventing expatriate supervisors and experts from visiting the field. This situation has delayed the installation of solar facilities. Hopefully, the current situation in terms of security is improving slowly but surely and SCF regional program officer will go back to Kellé in the beginning of 2014 in order to assess the progress done by the new site manager and to prepare the mission with the international experts.

- In 2013, 3 adult birds (1 male, 2 females) died from injuries due to feral dog attack and aggressive behavior from the males during the mating period. The site manager was replaced in November and the surveillance of the birds has been seriously improved in the past 3 months. In order to strengthen the captive breeding population, it is primordial to acquire new birds from Chad, Nigeria and from the two other breeding centers in Niger based in Iferouane and Mainé Soroa. The implementation of the memorandum of understanding between the different stakeholders will facilitate the acquisition of new chicks from the other breeding centers in Niger.

- Well construction within the site in order to be autonomous for water supply has been postponed to 2015 depending on the results of the project since it is tightly related to the number of birds.

- Train the new site manager to improve husbandry in natural incubation, and chick rearing; improving the hatch rate and chick survival, and introducing techniques in artificial incubation and hatching. Several EAZA Zoos in France are supporting SCF and agreed to host and train the site manager for 1 month in 2014.

- Work closely with traditional leaders and local authorities to raise awareness amongst the local population and more particularly with the pupils from the region in the perspective of future reintroduction in a pre-release site nearby Kellé but also to promote the support at local level of the breeding centre needed to maintain ideal conditions for reproductive success.

- Raise funds (US$ 100,000 for the next 4 years) to continue the implementation of the activities in order to reintroduce North Africa Ostriches into the wild within 10 years.

Site Manager with a chick from Northern Nigeria

Awareness campaign at school in Kellé's region

This project is made possible through the generous support of the following: St Louis Zoo, Houston Zoo, Smithsonian National Zoo, Columbus Zoo & Aquarium, Detroit Zoological Society, Dickerson Park Zoo, Fort Wayne Children's Zoo, Phoenix Zoo, Safari West, San Francisco Zoo, Omaha's Henry Doorly Zoo, Zoo New England, Sacramento Zoo, Fresno's Chaffee Zoo, Disney's Animal Kingdom, Dallas Zoo AAZK, Audubon Nature Institute, North Carolina Zoo, San Diego Zoo Global, West Texas AAZK, AAZK Lion Country Safari, Milwaukee County Zoo, Riverbanks Zoo AAZK, Zoo Miami, Busch Gardens, Ratite TAG, The Living Desert, Zoo Atlanta, Marwell Wildlife, Woodland Park Zoo, Hogle Zoo, Tulsa Zoo, Windermere Elementary School, Bill Houston, Michael Maunder, Sara Hallager, Randi Cremmins & Mike Bossier.

Thank you for your support!

Excuse Me, Why is that Ostrich Bald?!

By Sheri Horiszny, Santa Barbara Zoo

It seemed so simple at the start:

- Send an ostrich incubator to Uganda
- Hatch out some ostrich chicks
- Train local people in the Karamoja region to farm ostrich as an added revenue and protein source
- Reduce poaching pressure on wild ostrich and giraffe in the region

And then reality set in:

- You need a hatcher to go with the incubator
- The incubator and hatcher each weigh over 750 pounds, and cost over $13,000
- Shipping the units to Entebbe, Uganda costs about $9,000
- And, no one is certain what subspecies of ostrich we are about to farm!

The thousands of dollars and shipping challenges suddenly seemed small hurdles compared to the subspecies question: Are the ostriches in the Karamoja region of northeastern Uganda *Struthio camelus camelus*? Or are they *Struthio camelus massaicus*? Are we planning to farm a subspecies that is doing relatively well in the wild (*S. c. massaicus*), or one that is known to be very limited in numbers (*S. c. camelus*) and in need of conservation help? Not wanting to serve up 'critically endangered hamburgers', and unable to find a solid answer after consulting with several experts, we set out to get permits and supplies for genetic testing.

When *Care for Karamoja* founder, Sheri Horiszny, traveled to Uganda in August 2013 to meet the incubator and hatcher shipment, she also had a chance to meet partners at Uganda Wildlife Education Centre (UWEC) and see ostriches confiscated from the Karamoja region. While out feeding with UWEC animal care staff, Sheri noticed that the ostriches were bald, and asked why, but no one seemed to know. The answer did not present itself until weeks later, when Sheri was back home and Steve Wylie produced an old key that suggested the "naked head shield" was a distinguishing feature between *S. c. camelus* and *S. c. massaicus*. Photos taken at UWEC were then shared with the same experts, along with the key, and all agreed that the ostriches native to the Karamoja region are, in all likelihood, the rare *S. c. camelus*.

Suddenly, the plan to farm ostriches did not seem like the best conservation action! UWEC is now working with Uganda Wildlife Authority (UWA) to refine the project design and goals. We hope to utilize the incubator and hatcher for a breeding and reintroduction program for *S. c. camelus* into Kidepo Valley National Park in Karamoja. In 2014, Care for Karamoja plans to help complete a census of the ostrich and giraffe populations in Kidepo Valley N.P., and to help educate the rangers in the park about the rare animals they are protecting.

Care for Karamoja

(Special thanks to Sara Hallager, the Ratite TAG, and Steve Wiley for help in solving the subspecies mystery.)

For more information, and updates as this story unfolds, please visit www.care4karamoja.org and like "Care for Karamoja" on facebook. Or, contact Sheri at shoriszny@sbzoo.org.

Running with Rheas

By Kelsey Kuhn, Sequoia Park Zoo

As a small zoo moving towards geographically themed exhibits, we decided to move our 1.1 greater rhea to their appropriate placement in our future Tropical Andes Biodiversity Hotspot zone. It was hoped the rhea would mix with our 2.0 Chacoan peccaries since their exhibit is 28,000ft^2 and its open, grassy nature would be perfect for displaying both species. However, to our knowledge this mix of species had not been done before except at the Audubon Zoo where 1.0 collared peccary shares an exhibit with 1.2 rhea. Our birds had been introduced to our barnyard hoofstock for paddock grass management for years and due to their calm temperaments we felt confident that the mix would be successful.

This combination had been attempted about 6 years earlier at our zoo. In that case there was no opportunity to howdy the two species so our (then 1.2) rheas were herded into the exhibit while the peccaries were on the far end. When the older female saw the peccaries she began running into the fence although the juvenile rheas showed no reaction. The introduction was aborted about 5 minutes later due to health concerns for the older female. That female had since passed and we believed our rhea would do well with the peccaries. We divided our peccary exhibit with a hog panel fence (covered with shade cloth for the intro), sectioning off about a third of the exhibit and added a holding pen outside the peccary night house. This arrangement would allow both species to remain on exhibit and allow for shifting opportunities during the introduction. On the day of the move the peccaries were locked in one section and the rheas were herded into the other with little stress. They remained alert just inside the exhibit and watched the peccaries across the paddock without obvious signs of stress. Unfortunately 45 minutes into the intro a worker on a nearby roof started up a leaf blower which spooked the rhea. The male began frantically trying to get through the chain link fence. Keepers covered the chain link with shadecloth which resulted in him pacing along it instead. The female calmed down quickly but the male paced for the rest of the day until he bedded down exhausted. He paced and was weak for several days prompting the diagnosis of capture myopathy by our vet. During this time the female was unconcerned and explored the exhibit. The male made a full recovery within 10 days and began the breeding season on time.

We physically introduced them 3 months later. They were showing no aggression through the fence but because the male was nesting we wanted to wait till after the breeding season before introducing them. Then we found two dead chicks within a couple days of each other. Concerned that the female killed the chicks we moved her in with the peccaries. The introduction of the female to the peccaries was blissfully uneventful. The peccaries passed within 3 feet of the female and neither species reacted at all. After the hatch date for the remaining chicks passed (the female's egg laying was unusually protracted and some of the eggs were laid months apart) we allowed the peccaries and female rhea full access to both exhibits. Though the male was still sitting on his nest he and the peccaries ignored each other.

After a year both species are doing well. The only issue we've had is with food aggression. Their grain diets are fed in ways that prohibit stealing, however the peccaries are fed their produce diet in their pen to allow the possibility of catch up if needed. The rhea who were picky until then now found the peccaries' lettuce irresistible. Though they often graze near each other, the peccaries are protective of their produce and the rhea are oblivious. For the rhea's safety we now have to shift the peccaries in their pen without the rhea so we can separate them. This was achieved by giving the rhea small amounts of lettuce outside the pen after locking the peccaries in. Otherwise they coexist peacefully and are often found near each other though the size of the exhibit allows for considerable distance between them. We will soon be adding 1.2 juvenile rhea to our flock and will be using the same method to introduce them to first our current rhea and then to the peccaries. Hopefully we'll be able to give you an update this time next year.

Investigating the Captive Husbandry Protocols of *Pterocnemia pennata* (Darwin's Rhea) in Europe to Improve the Breeding Success and Survival Rate of Chicks.

By Tegan Sutton[1], Peter Smallbones[2] and Dr. Judith Lock[1]

[1]Centre for Biological Sciences, University of Southhampton

[2]Darwin's Rhea ESB Co-ordinator, Paignton Zoo Environmental Park

Introduction

Pterocnemia pennata originate in southern Chile, west-central and southern Argentina with an introduced population in north Tierra del Fuego. It has been listed as near threatened since 1988 as declines in its population are predicted to approach the threshold for classification as vulnerable in the near future (http://www.iucnredlist.org/details/100006003/0).

Many conservation acts have been introduced to try and protect the native population from declining further by developing awareness campaigns against egg collecting, illegal hunting and domestication of immature wild birds. Since the first native breeding farm was built in Southern Chile 1980, the captive holding of *Pterocnemia pennata* has expanded widely across Europe with 33 institutions now holding a total of nearly 100 birds (Lichtschein, 2002). The breeding success within these institutes varies dramatically however 95% have very poor recorded breeding success and survival of chicks, the reason for this is as of yet unknown.

Aims:

- Investigate why the survival of *Pterocnemia pennata* is so low in European captive institutes.
- Produce improved husbandry guidelines to increase the survival rate of chicks.

Methods of investigation:

Behavioural observations:

Behavioral observations were vital to understand the social interactions, activity budgets and feeding behaviour of *Pterocnemia pennata* flocks. Instantaneous scan sampling was used at one-minute intervals for five hours a day to assess the behaviour of individual birds and their interactions within the flock. This procedure was undertaken over a five-day period in three European countries; England, France and the Czech Republic. These institutes were chosen due to their differences in past breeding successes and group composition.

Questionnaire:

A detailed questionnaire was sent to all 33 European Zoo's to try and gather important information on the current captive husbandry procedures of *Pterocnemia pennata.* The questions ranged from details regarding adult breeding/feeding regimes and chick rearing/diet protocols, all of which are essential to the survival of chicks.

Preliminary results:

Behaviour:

As expected there was a significant difference in the social behaviours observed between just a single pair of birds compared to the larger flock of birds. The flock of 11 birds in the Czech Republic showed significantly more negative social behaviour towards eachother compared to the pairs of birds. This suggests a hierarchy exists within the larger more natural flock sizes, which could have an effect on the breeding and survival of captive chicks.

Questionnaire:

To date I have received 13 responses from across Europe with 75% of these institutes hand-rearing their chicks instead of the natural parent rearing process. This choice would have been made for viable reasons such as the abandonment of the nest or the male bird failing to incubate the eggs sufficiently. The majority of chicks at each Zoo failed to hatch and the ones that did survive, on average died within the first 4 days of life. This therefore shows that the rearing protocol in captivity is not sufficiently refined for chick survival, whether this is due to diet/nutrition, rearing substrate or a lack of resources from the mother's egg, we do not know as of yet.

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Bringing Up Birdie: Zoo Keepers Learn to Care for Tricky Chicks

Aviculturists at Paignton Zoo Environmental Park in Devon are learning how to care for some difficult chicks. They are developing a new protocol for hand rearing Darwin's rhea. Darwin's rhea (Rhea pennata), also called the lesser rhea, is a large flightless bird from South America.

An adult bird can stand up to 100 centimetres (39 inches) in height and can weigh as much as 28 kilos (63 pounds). It can reach speeds of up to 60 kilometres an hour (37mph). While the bird breeds occasionally in zoos, chicks can be difficult to hand rear. Curator of Birds Jo Gregson explained:

"We are trying to develop a protocol for hand rearing. Paignton Zoo has a good record with ratites – cassowaries, emus, ostriches – which is why we took on the job. We also hold the studbook for these birds now. It's important to learn all we can about how to care for them."

Keepers took eggs that were scattered around the enclosure and were not going to be cared for by the adult birds. Of these, 3 have hatched so far - one on 8th June and the other two on 9th - with more eggs in the incubator. Everything from the temperature and humidity in the incubator to how often the eggs are turned is recorded. Once the eggs hatch, aviculturalists make a note of every last detail of rearing – what, when and how often the chicks eat, how much exercise they get, and so on. Failure can tell staff as much as success. Information is compiled and shared with other collections. And what is the secret? Jo: "It's all about the poop! Constipation can be a problem for chicks and it can kill. Exercise helpsExercise helps to keep them regular. Keepers have to encourage them to walk and then run. They also need Vitamin D, so we have to get them out into the sunshine. They are terrific, but they are not the brightest of birds!" Charles Darwin came across the species during the second voyage of HMS Beagle, in 1833. The party shot and started to eat one before Darwin realised that this was the new species he had been looking for. He managed to preserve the head, neck, legs, one wing, and many of the larger feathers.

Catching Up with Cassowary

News From ZAA, James Biggs, Supervisor, Bird & Mammal Departments, Species Coordinator Southern Cassowary, Cairns Tropical Zoo

An investigation in the Australasia region relating to mate choice and its possible value to captive cassowary management and breeding continued into its second season this year.

Historically institutions in most regions worldwide have limited their cassowary holdings to 1.1.0 – a social system that is rarely, if ever, encountered by cassowaries in a natural setting. Despite the fact that a small handful of establishments have had success with this configuration, most have observed little to no success year after year. Some establishments have observed interest from either their male or female bird, but often this is directed towards either a keeper or inanimate object.

At present, a number of larger establishments are trialing a method using a three-enclosure, three-bird (either 2.1.0 or 1.2.0) system. Three enclosures situated side by side, are linked by single holding pen adjoining all three enclosures. For the 2.1.0 configuration, the female is housed in the middle enclosure with visual access to a male in each of the two adjoining enclosures – vice versa for the 1.2.0 configuration. In the first scenario, the female is given the opportunity to interact with two males simultaneously but on an individual basis, at her discretion. The likelihood of observing positive interactions between the female and at least one bird is increased.

Establishments that are using the three-enclosure three-bird system are generally finding greater success where previously they saw little; however, with so little data, it is difficult to make any solid conclusions at this stage. Some institutions that were producing no eggs are now producing eggs; and some that were producing infertile eggs are now producing fertile eggs. We are still however, only observing limited success in progressing past hatch. In most situations the birds involved were first-time breeders, so some of these factors may be put down to inexperience.

The trial will continue into the 2014-2015 season whilst evaluating other factors such as parental nutrition and body condition.

Catching Up with Cassowary

Cassowaries at Toledo Zoo, by Chuck Cerbini

This spring, the Toledo Zoo's pair of Double-wattled Cassowaries will make their 2014 debut in a brand new exhibit, directly adjacent to the Zoo's award-winning Aviary. When the Cassowaries first arrived at the Zoo in November of 2012, they were only about six months old and have since shared a pen viewable from the inside of the Aviary. This year, however, guests will be able to see "Red" and "Zilla" in a new home made up of two adjacent yards totaling over 5,000 square feet.

Along with this exhibit is a newly-constructed barn consisting of two separate holding areas with a transfer area in between. The barn is heated and can maintain temperatures of up to 80°F in the coldest winter months. In addition, keeper corridors adjacent to each holding area allow for easy shifting and the specialized howdy windows here enable the caretakers to train the birds using target poles.

We are excitedly awaiting the opening of our new Cassowary Exhibit, and the event will surely be a great part of what looks to be a wonderful year for birds at the Toledo Zoo.

Photo credit Toledo Zoo/Ken York

Collaborative Partnerships - working together to Save a Prehistoric Bird; Save the Cassowary campaign

Public Awareness, Education and Fundraising campaign

By Jennifer Croes

The lowland tropical rainforests of the Wet Tropics, Queensland is home to the endemic Southern Cassowary (*Casuarius casuarius johnsonii*), a keystone species which plays a vital role in the preservation of tropical rainforest diversity by dispersing the seeds of at least 238 rainforest plant species. The Southern Cassowary is listed as Endangered under the Australian Environment Protection and Biodiversity Conservation Act (1999). This prehistoric bird, has survived and adapted since its evolution around 80 million years ago, yet, habitat loss in the Wet Tropics and encroaching human settlement, roads, dogs and habitat fragmentation are its main threats for local populations. 85% of tropical lowland-rainforest has been cleared with remaining habitat fragmented and degraded, isolating groups of cassowaries and disrupting their movement and genetic diversity. It is unknown how many birds remain in the wild due to the difficulty of accurately assessing cassowary numbers and there is a pressing need for further research. In 2001 it was estimated at 1,500 adults, [(1)] yet we have experienced two devastating cyclones (Cyclone Larry, 2005-2006 and Cyclone Yasi, 2011) since then with devastating impacts on local populations. Although much work has been done to conserve and manage cassowaries for more than two decades, their numbers continue to decline**.**

This prompted Rainforest Rescue to initiate a national, collaborative "Save the Cassowary" campaign with ZAA member zoos which have Southern Cassowaries in their inventory as well as other key stakeholders including the Queensland Department of Environment and Heritage Protection (DEHP), Wet Tropics Management Authority (WTMA), local councils and local Aboriginal Corporations as well as our business partners. The objective of the campaign is to raise awareness and mobilise community effort towards the plight of the Southern Cassowary and its role as a keystone species and raise funds to support Rainforest Rescue's in-situ conservation projects. It is not a single-species focused conservation campaign however as an Ambassador species, the cassowary lends itself to telling the story and significance of conserving the Wet Tropics of Australia as the 'voice' of the rainforest. At a local community level, the focus is to increase community awareness and improve the co-existence of cassowaries and people and engage Traditional Owners to contribute towards cassowary conservation. Conservation is about people and to save the rainforests and the iconic southern cassowary, we need to engage people and change their perceptions, attitudes and behaviours.

Indigenous Traditions & Values

Cassowaries are considered a sacred animal by the Indigenous people of the Wet Tropics and Cape York. Traditional Owners of the Wet Tropics have strong connections to the cassowary, which appears in important traditional stories, ceremonies and dances. More than 18 indigenous groups of the Wet Tropics and Cape York region consider the cassowary to be a keystone species which enables the rainforest ecosystem to remain in balance. Traditional owners have witnessed the impact of reduced cassowary habitat which has led to a decrease in cassowary numbers and plant diversity. The link between country and the natural environment are obvious, and the continued involvement of traditional owners in environmental management is vial to ensure future success in the maintenance and continuation of cultural and spiritual practices and education.

Continued on next page…….

Rainforest Rescue Cassowary Conservation Projects

The aim of this campaign is to raise funds to allow us to undertake our in-situ conservation cassowary conservation programs to complement the in-situ work by our partner zoos.

Our conservation programs include;

Cassowary Habitat Protection- continue with our successful land buy-back program; identifying and purchasing precious rainforest at risk of development and establishing Nature Refuge status to protect it forever. We focus on High Conservation Value (HCV) blocks of land and prefer those that adjoin land we already own for habitat connectivity and corridors. We have purchased 22 properties to date with another 2 to be settled in April 2014.

Cassowary Habitat Restoration and Corridors – continue with habitat restoration and wildlife corridor development in the Wet Tropics utilising our own plant nursery located in the Daintree and our new local Indigenous partner, Girringun Aboriginal Corporation in Mission Beach. Rainforest Rescue's 'Cassowary Corridor Restoration' project is contributing to significant conservation outcomes outlined under the Australian Government's Biodiversity Conservation Strategy (2010 – 2030). To date we have planted a total of 51,149 trees.

Cassowary Rehabilitation – commence our dual partnership with the QLD Department of Environment and Heritage Protection (DEHP) – Threatened Species Unit and the Girringun Aboriginal Corporation, to co-manage the Garners Beach Cassowary Rehabilitation Centre located in Mission Beach. The rehabilitation centre was established in 2001 to provide intensive care and rehabilitation for sick and injured cassowaries and orphaned chicks. In response to the devastating impact of Cyclone Yasi on local populations, the rehabilitation centre was inundated by affected birds. This new partnership will see the continuing operations of this facility under this 3-way partnership with Indigenous Rangers playing a key role towards cassowary conservation.

Cassowary Research – Collaborate with knowledge experts, universities, research laboratories, zoos and other institutions to contribute towards much needed research.

Current research opportunities to be considered and negotiated include;

Contribute towards continuing the cassowary tracking and monitoring research

Contribute to Population dynamics and monitoring

Population modelling and road kill management.

Rainforest Rescue analysed mortality data and during the period 1992 to January 2014, 104 deaths were reported as vehicle strikes in the Wet Tropics. [(2)] Utilising existing data sets obtained from managing the number of cassowary road fatalities, assess spatial and temporal patterns to identify hotspots and identify intervention strategies to mitigate this.

rainforest rescue
Protect Rainforests Forever

Continued on next page

The role of Zoos in this collaborative campaign

Zoological institutions play an influential role in ex-situ and in-situ conservation and education to visitors. An estimated 15.4 million visitors per annum attended zoos including international tourists, with 76% of international tourists stating that they are interested in experiencing iconic, native wildlife. It is reported that zoo visitors are more likely to donate to conservation causes than non-visitors and 75% of visitors learnt something new or increased their existing knowledge.(3) Collaborating with over 25 partner zoos with Southern Cassowaries in their inventory provides the platform to raise the profile of this iconic species and raise funds to deliver conservation projects such as land buy-back, habitat restoration, cassowary rehabilitation, road fatality mitigation and scientific research in partnership with Rainforest Rescue.

Marketing and Communications

Publicity, promotion and marketing plays an important role in building awareness of the campaign through public-facing materials such as the zoo signage, brochures, marketing collateral, websites, social media, press releases and media appearances. Rainforest Rescue has planned an integrated, consistent communications and media plan with the tagline "Who am I?" with the branding consistent across all our marketing collateral including the Zoo signage t across all participating zoos. Our business and campaign partner BioPak, has created a special biodegradable coffee cup to be sold throughout Australia at participating outlets to promote the campaign.

Jennifer J. Croes is Director, Conservation & Partnerships at Rainforest Rescue

www.rainforestrescue.org.au

News From AZA, Nicole LaGreco, Southern CassowarySpecies Coordinator, San Diego Zoo

Cassowaries…..Where we've been and where we're going:


Photo credit Nicole LaGreco

In July of 2013 I was awarded the International studbook for Southern cassowary (*Casuarius casuarius*). While we already had an excellent working relationship with our counterparts in Europe and Australia this studbook would further solidify those relationships. After confirming support from my counterparts in other regions I began the applications process, which was a bit daunting, even for this seasoned studbook keeper. I was required to apply to AZA's Wildlife Conservation and Management Committee (WCMC) prior to submitting my application to the World Association of Zoos and Aquariums (WAZA). Once WCMC approved my application, I sent their approval letter along with my four page application and letters of support from EAZA and AZA's Ratite TAG off to Switzerland for approval. Within three weeks, I received a letter back from WAZA congratulating me on the successful application. So what does this mean for cassowary? Hopefully it means we are headed in the direction of establishing a global species management plan and a solid worldwide conservation effort to ensure cassowaries are around for future generations.

Cecil's Corner

Everyone by now has heard about the snow-pocalypse that has been occurring in Atlanta over the last couple of weeks. We also know how worried you must have been about our old friend Cecil, and how he's been coping with this unusual weather. Well fear not, I have a full report!

His exhibit is covered in a layer of ice topped off by a layer of snow. His wallow is a pool of slush.

But where is Cecil? Does he not enjoy the soft cool snow under his feet? Does he not enjoy making cassowary angels in the snow like the kids in the park just outside the zoo gates? Where is he?!

No, Cecil is not a fan of the conditions outside his inside stall. So much so that he refuses to step outside! Cecil moved down to the South just like a lot of other retirees do, to get away from the cold! He prefers to spend these blistery days inside on his giant bed covering a nice warm heat pad!


"Who me?"

Emu Encounters

Enriching Emu by Dana Urbanski, North Carolina Zoo

Dromaius novaehollandiae better known as the Emu, is Australia's largest native bird. Emus have good eyesight and hearing. They inhabit sclerophyll forests and savanna woodlands. They usually live in groups between two and five birds. They mostly eat flowers but also fruits, seeds and insects.

Enriching this ratite can be a challenge but taking into consideration its natural history and behavior there are several ideas that are easy for keepers to do and right up the Emus alley.

Installing mister hoses or having wallow areas where the birds can bathe and soak is probably number one on their list of enrichment. Foraging for insects or fruit chunks is also a favorite. These items can be hidden in toys and substrate or scattered over their yard. Hanging various produce such as romaine or kale from fencing or making a "mobile" from approved materials seems to be fun for Emus too. Training can also be a form of enrichment as well. Some other enrichment ideas include different types of browse such as Arctic willow and bamboo leaves, large pieces of cloth or burlap that the birds can sit on or drag around, hard boiled eggs and hard plastic baby toys.

There are several things to consider when offering enrichment. The most important thing is that the enrichment is safe and approved for your particular institution and animals. The second is to keep trying! Take time to get to know your Emus preferences and watch their behavior. Enrichment is providing the animal with objects to stimulate them to do natural behaviors but it is also about having a relationship with your animal.

Keeping Up With Kiwi

2013 Update by Kathleen Brader

Kia Ora from the Kiwi world. As with most programs we had some successes and some loss. The worst and saddest loss came with the death of the breeding female (Gruen) at Columbus Zoo last year. Gruen with her mate produced a total of 3.5 chicks of which 3.3 are still living. I know that the staff at Columbus did their best for Gruen (who injured her bill) and worked for months nursing her. My sympathy to the staff, it's always hard to lose any of the creatures we work with but even harder when you work so hard to save it.

The other big loss to our population is at the Berlin Zoo, who lost a male, Otto. Otto was a wild caught kiwi with an estimated hatch in 1981. Otto was a favorite with his staff and known for his calm and sweet disposition. For those of us who work with kiwi that kind of nature is rare, kiwi do tend to be on the aggressive side.

Our population stands at 51 birds, 34.17 birds spread between 13 institutions, this includes both the European and North American groups. This past year we welcomed Toledo Zoo to our group and look forward to many years of working with them. The only surviving chick from 2013 was hatched at SCBI, a female from an egg from Columbus Zoo.

SNZP sent over our last female chick to Berlin Zoo where she is joined by a young male there for future breeding. We are also getting ready to send over a young male from SCBI (one of Gruen's chicks) to Alphen (Netherlands) soon. There is female who is waiting anxiously (well I hope she is) for Pokey to join her.

Currently the only kiwi egg this season is at SNZP that was laid on Christmas Day but the embryo died early on.

I am heading over to New Zealand this March and among the many zoos and sanctuaries I am planning to visit, I will be attending my first Kiwi Hui. New Zealand's Department of Conservation and "Kiwis for Kiwi" sponsor a 2-3 annual conference on work being done with kiwi. It usually has several different topics that range from research (both field and captive), new pest control methods. They publish a DVD from the conference each year and it's well worth obtaining one if you are interested in kiwi work. I have been asked to present a talk on the international kiwi scene.

The updated studbook was published last fall and is available on the AZA website (or you can email me, braderk@si.edu).

Like most programs out there we are always looking for folks to come on board, if interested in having kiwi at your zoo please feel free to contact me for more information on keeping this fascinating and adorable birds.

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Kiwi feathers wing their way back home

By ANNA TURNER

KIWIS MAY be flightless, but that hasn't stopped some of their feathers making a 13,000-kilometre journey.

Thousands of feathers from kiwis born in America have been returned to New Zealand to be used for traditional Maori weavings and restoring korowai (cloaks).

The Smithsonian National Zoo in Washington is one of the few places in the world that holds and breeds kiwis.

Kiwi birds moult throughout the year, but the zoo did not realise the cultural significance behind the feathers until a visiting New Zealander began picking them up. As a result, the zoo decided to collect the feathers and return them to their home country.

National Zoo head kiwi-keeper Kathy Brader said returning the feathers was a "way of immortalising our birds".

"It offers a means of involving them directly in conservation and cultural recovery efforts, and it takes very little work on everyone's part. It's a classic win-win situation."

The feathers were donated to New Zealand in a ceremony last October at Auckland Zoo, attended by Roger Smith from the Ministry of Primary Industries and the Director of the Smithsonian Zoo, Dennis Kelly.

The feathers were given to Auckland iwi Ngati Whatua and would be used for weaving and restoration of cloaks.

The cloaks are given names and passed down through generations. Rare feathers lend great mana to a cloak and its wearer, so kiwi-feather cloaks have a chiefly status.

As a gesture of thanks, Smith recently returned to Washington with a miniature korowai woven with some of the kiwi feathers which were collected from the zoo. Two of the kiwis, Koa and Pip, posed next to the cloak.

The Smithsonian Zoo will continue to gather feathers from their kiwi and send a shipment to New Zealand each year.

There are 52 kiwis outside New Zealand, held in 13 zoos around the world, including Frankfurt, Berlin, San Diego and the Netherlands.

In 1851, London became the first zoo to keep kiwi after New Zealand sent a North Island brown female kiwi to the Zoological Society of London. The first successful breeding in captivity of kiwis took place in Hawke's Bay in 1945.

Long haul: American kiwi Koa next to a miniature cloak woven from feathers donated to New Zealand by the Smithsonian National Zoo in Washington.

Time for Tinamous


Photo credit Mehgan Murphy / National Zoo

Twelve species of tinamou are now listed by IUCN as either vulnerable or near threatened and over 30 species are listed in decline I[UCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Downloaded on 16 February 2014.] Many species of tinamou have scarcely been studied so their true conservation status remains unknown. Tinamous are some of the most commonly harvested bird species by subsistence hunters in the New World due to their terrestrial habits and relatively large size (0.43 kg-1.8 kg). In regions where there is sport and commercial harvest they are primary targets. Despite the importance of tinamous as game birds, their diversity, extensive distribution, and that a relatively high proportion of species are listed as threatened and endangered, little is known of their biology.

The TAG manages one species of tinamou: elegant crested tinamou at the Yellow SSP level.

Crypturellus atrocapillus (Black-capped Tinamou)
Status: Near Threatened ver 3.1
Pop. trend: unknown

Crypturellus duidae (Grey-legged Tinamou)
Status: Near Threatened ver 3.1
Pop. trend: decreasing

Crypturellus noctivagus (Yellow-legged Tinamou)
Status: Near Threatened ver 3.1
Pop. trend: decreasing

Crypturellus transfasciatus (Pale-browed Tinamou)
Status: Near Threatened ver 3.1
Pop. trend: decreasing

Tinamus guttatus (White-throated Tinamou)
Status: Near Threatened ver 3.1
Pop. trend: decreasing

Tinamus major (Great Tinamou)
Status: Near Threatened ver 3.1
Pop. trend: decreasing

Tinamus solitarius (Solitary Tinamou)
Status: Near Threatened ver 3.1
Pop. trend: decreasing

Crypturellus kerriae (Choco Tinamou)
Status: Vulnerable B1ab(i,ii,iii,v);C2a(i) ver 3.1
Pop. trend: decreasing

Nothocercus nigrocapillus (Hooded Tinamou)
Status: Vulnerable A3c ver 3.1
Pop. trend: decreasing

Nothoprocta taczanowskii (Taczanowski's Tinamou)
Status: Vulnerable B1ab(i,iii,v) ver 3.1
Pop. trend: decreasing

Taoniscus nanus (Dwarf Tinamou)
Status: Vulnerable A2c+3c+4c ver 3.1
Pop. trend: decreasing

Tinamus osgoodi (Black Tinamou)
Status: Vulnerable A2cd+3cd+4cd ver 3.1
Pop. trend: decreasing

Tinamus tao (Grey Tinamou)
Status: Vulnerable A3c ver 3.1
Pop. trend: decreasing

Odds & Ends About the TAG and our Feathered Friends

What the heck is a palognath?!

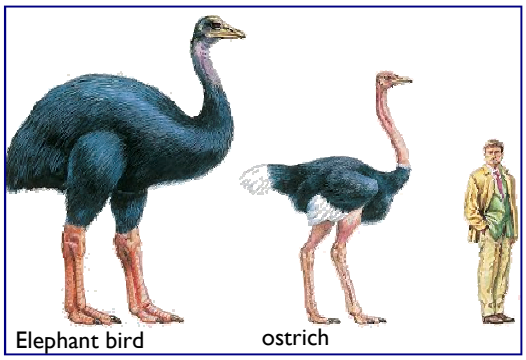
The Palaeognathae, or paleognaths, consist of the ratites and the tinamous. All other groups of birds are Neognaths. Palaeognaths are separated from all other bird species on the basis of their distinctive palate (jaw) morphology.

There are three extinct groups, the Lithornithiformes (tinamou like in appearance) the Dinornithiformes (moas) and the Aepyornithiformes (elephant birds).

The word *Paleognath* is derived from the ancient Greek for "old jaws" in reference to the skeletal anatomy of the palate, which is described as more primitive and reptilian than that in other birds. Paleognathous birds are the most primitive living birds, though there is some controversy about the precise relationship between them and the other birds. There are also scientific controversies about their evolution.

Get involved with the TAG!

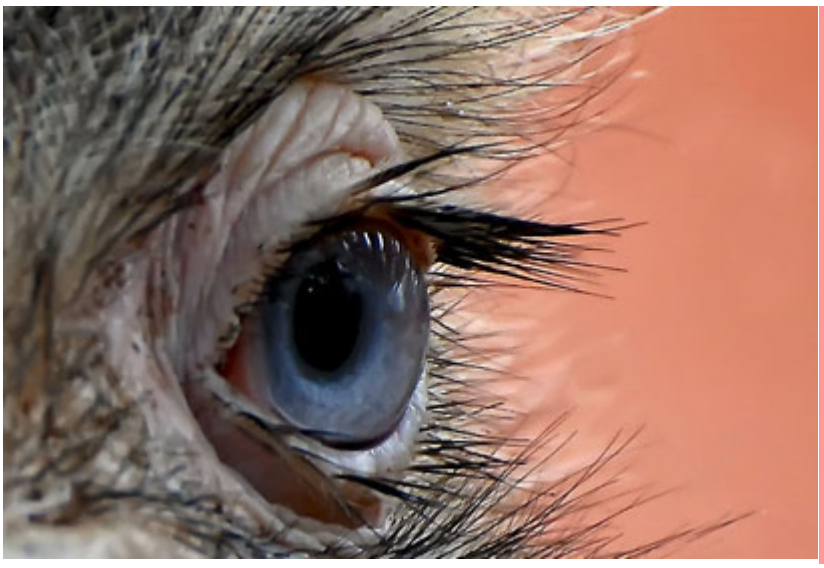
Love ratites and want to do more to help them? Check out the "get involved" section of the Avian Scientific Advisory Group webpage at http://aviansag.org/TAG/Get_Involved/Ratite.html . We'd love to have you help us!



TAG Mart Update

The Ratite TAG once again participated in AZA's annual TAG mart at the AZA National Conference in KS City. Thanks to staff from Kansas City for helping out! Proceeds from the sale will be used to support TAG projects.

ASSOCIATION OF ZOOS & AQUARIUMS



Thanks for reading our annual newsletter! If you have an idea for next year or are interested in writing a piece you can contact Sara Hallager at hallagers@si.edu or Monica Halpin at mhalpin@zooatlanta.org.

It's never too early to turn in your submission!

AZA Ratite & Tinamiformes Taxon Advisory Group

AZA Ratite & Tinamiformes TAG

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Kristen Clark, Greater Rhea, Smithsonian National Zoological Park
Kristen Clark, Elegant Crested Tinamou, Smithsonian National Zoological Park
Nicole LaGreco, Southern Cassowary, San Diego Zoo

Species Champions

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Scott Tidmus, Ostrich, Disney's Animal Kingdom